

## **REMARKS**<sup>1</sup>

In the outstanding Office Action, the Examiner objected to claims 1 and 3-14; rejected claims 1, 3, 7, and 9 under 35 U.S.C. § 102(b) as being anticipated by Cocorullo et al., “Amorphous silicon waveguides and light modulators for integrated photonics realized by low-temperature plasma-enhanced chemical-vapor deposition,” (“Cocorullo”); rejected claims 1 and 4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,533,907 B2 to Demaray et al. (“Demaray”); rejected claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Cocorullo in view of Beach, Raymond J., “Theory and optimization of lens ducts,” Applied Optics, Vol. 35, No. 12, pp. 2005-2015 (April 20, 1999) (“Beach”); rejected claims 6, 10, 12, and 14 under 35 U.S.C. § 103(a) as being unpatentable over Cocorullo in view of U.S. Patent No. 6,760,520 to Medin et al., (“Medin”); rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Cocorullo in view of Hübner, Jörg et al., “Planar Er- and Yb-doped Amplifiers and Lasers,” COM Technical University of Denmark, 10th European Conf. On Integrated Optics, Session WeB2, pp. 71-74 (2001) (“Hübner”); and rejected claims 11 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Cocorullo in view of U.S. Patent Application Publication No. US 2003/0185266 to Henrichs (“Henrichs”).

By this amendment, Applicant has amended 1, 3-5, and 7-14. Claims 1 and 3-20 remain pending in this application, with claims 1 and 3-14 currently presented for examination.

### **I. Claim objections**

Regarding the Examiner objection of claims 1 and 3-14, the Examiner asserts that “[t]he limitations ‘high,’ ‘highly,’ and ‘intermediate’ are indefinite because it is unclear what would

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<sup>1</sup> The Office Action contains a number of statements reflecting characterizations of the related art and the claims. Regardless of whether any such statement is identified herein, Applicant declines to automatically subscribe to any statement of characterization in the Office Action.

qualify as ‘high’ or ‘intermediate.’” Office Action, page 2. Although Applicant disagrees with the Examiner’s assertion, Applicant has amended claims 1, 3-5, and 7-14 to delete recitations of “high,” “highly,” and “intermediate,” in order to expedite prosecution. Accordingly, Applicant respectfully requests that the Examiner withdraw the objection of claims 1 and 3-14.

## **II. Product by Process Claims**

The Examiner states that “[c]laims 1-14 do not distinguish over the prior art of record regardless of the process used to create the slab waveguide, because only the final product is relevant, and not the process of making such as DC-biased plasma vapor deposition.” Office Action, page 3. Although Applicant does not agree with the Examiner’s characterization of claims 1, and 3-14, Applicant has amended claim 1 to remove the process used to create the slab waveguide.

## **III. Rejection under 35 U.S.C. § 102(e)**

Applicant respectfully traverses the rejection of claims 1, 3, 7, and 9 under 35 U.S.C. § 102(e). “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference ... [t]he identical invention must be shown in as complete detail as is contained in the . . . claim.” MPEP § 2131 8th Ed. (Rev. 4), October, 2005 (internal citations omitted). Cocorullo cannot anticipate claims 1, 3, 7, and 9 because Cocorullo fails to teach each and every element recited in claims 1, 3, 7, and 9.

For example, Cocorullo fails to teach a combination including “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer,” as recited in amended claim 1. Cocorullo, in Fig. 1, shows a waveguide having an  $\alpha$ -Si:H(i) core surrounded by an  $\alpha$ -SiC:H(i) cladding, formed on a c-Si( $n^+$ ) substrate. Cocorullo fails to teach at least a buffer layer. That is, Cocorullo does not teach a

structure having a waveguide on a buffer layer. Cocorullo thus fails to teach at least “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in amended claim 1.

Moreover, Cocorullo also fails to teach a combination including the “slab waveguide having a refractive index contrast of at least 0.2%,” as recited in claim 1. At page 4 of the Office Action, the Examiner asserts that “[t]he refractive index contrast is 0.40.” The Examiner has apparently subtracted the refractive index of a-SiC:H from the refractive index of a-Si:H, as given in Table 1 of Cocorullo to obtain this number. Contrary to the Examiner’s assertion, a refractive index contrast D is defined as being equal to  $\frac{(n_1^2 - n_2^2)}{2n_1^2}$ , where  $n_1$  and  $n_2$  are the respective refractive indexes of the core and cladding. This is defined in Federal Standard 1037C, Telecommunications: Glossary of Telecommunication Terms, and is thus well-known in the art. Accordingly, the refractive index contrast of the materials given in Table 1 of Cocorullo is approximately 0.111. Claim 1, on the other hand, recites a combination including the “slab waveguide having a refractive index contrast of at least 0.2%.” Because 0.111 is not “at least 0.2%,” Cocorullo fails to teach at least this element.

For at least the foregoing, Applicant submits that Cocorullo fails to teach each and every element of amended claim 1. Claim 1 is thus allowable over Cocorullo, and claims 3, 7, and 9 are allowable at least due to their dependence from claim 1. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 1, 3, 7, and 9 under 35 U.S.C. § 102(e).

#### IV. Rejections under 35 U.S.C. § 103(a)

Applicant respectfully traverses the rejection of claims 1, 4-6, 8, and 10-14 under 35 U.S.C. § 103(a) because a *prima facie* case of obviousness has not been established. To establish

a *prima facie* case of obviousness under 35 U.S.C. §103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element recited in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three requirements must “be found in the prior art, and not be based on applicant’s disclosure.” See MPEP § 2143, 8th Ed. (Rev. 4), October, 2005.

In this application, no *prima facie* case of obviousness has been established for at least the reason that the cited references, whether taken alone or in combination, fail to teach or suggest each and every element required by claims 1, 4-6, 8, and 10-14.

A. Demaray

Regarding the Examiner’s rejections under 35 U.S.C. § 103(a) as being unpatentable over Demaray, although Applicant respectfully disagrees with the Examiner’s arguments and conclusions as set forth in the outstanding Office Action, Applicant submits that the Examiner has made an improper rejection under 35 U.S.C. § 103(a) because Demaray is not prior art. Accordingly, Applicant respectfully traverses this rejection.

The cover sheet of Demaray asserts an effective filing date that is earlier than Applicants’ effective filing date. Demaray, however, has a publication date that is later than Applicants’ effective filing date, by virtue of Applicant’s claim of priority to Provisional Application No. 60/406,451, filed August 27, 2002. Accordingly, Demaray is potentially available as a prior art reference only under 35 U.S.C. § 102(e). Applicant hereby submits that the present application and Demaray were, at the time Applicant’s invention was made, commonly owned by

Symmorphix, Inc. Accordingly, Demaray is not prior art as specified by 35 U.S.C. § 103(c). See MPEP §§ 706.02(l)(1), 706.02(l)(2), 8th Ed. (Rev. 4), October, 2005.

For at least the above reason, Applicant respectfully submits that the Examiner has made an improper rejection under 35 U.S.C. § 103(a). Accordingly, Applicant respectfully requests that the rejection of claims 1 and 4 under 35 U.S.C. § 103(a) as being unpatentable over Demaray be withdrawn.

B. Cocorullo in view of Beach

Claim 5 depends from claim 1, and thus requires all of the elements recited in claim 1. As discussed above, Cocorullo fails to teach or suggest a combination including at least “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer,” as recited in claim 1, and required by claims 6, 10, and 12..

The Examiner asserts that Beach “teaches a waveguide device with a lens duct to couple light from a diode into a waveguide.” Office Action, page 5. Such alleged teachings, even if combinable with Cocorullo fail to cure the above-noted deficiency of Cocorullo. That is, Beach also fails to teach or suggest “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer,” as recited in claim 1 and required by claim 5.

Because Cocorullo and Beach fail to teach or suggest every element required by claim 5, a *prima facie* case of obviousness has not been established. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claim 5 under 35 U.S.C. § 103(a).

C. Cocorullo in view of Medin

Claims 6, 10, and 12 depend from claim 1, and thus require all of the elements recited in claim 1. As discussed above, Cocorullo fails to teach or suggest a combination including at least “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in claim 1, and required by claims 6, 10, and 12.

The Examiner asserts that Medin “teach a mode size converter ... that the mode size converter can be used in an array with an array of laser diodes and waveguides.” Office Action, page 6. Such alleged teachings, even if combinable with Cocorullo fail to cure the above-noted deficiency of Cocorullo. That is, Medin also fails to teach or suggest “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in claim 1 and required by claims 6, 10, and 12.

Because Cocorullo and Medin fail to teach or suggest every element required by claims 6, 10, and 12, a *prima facie* case of obviousness has not been established. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 6, 10, and 12 under 35 U.S.C. § 103(a).

D. Cocorullo in view of Hübner

Claim 8 depends from claim 1, and thus require all of the elements recited in claim 1. As discussed above, Cocorullo fails to teach or suggest a combination including at least “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in claim 1, and required by claim 8.

The Examiner asserts that Hübner “teach an optical waveguide device shown in figure 2a with a slab waveguide that is folded in the plane of the slab.” Office Action, page 6. Such

alleged teachings, even if combinable with Cocorullo fail to cure the above-noted deficiency of Cocorullo. That is, Hübner also fails to teach or suggest “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in claim 1 and required by claim 8.

Because Cocorullo and Hübner fail to teach or suggest every element required by claim 8, a *prima facie* case of obviousness has not been established. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claim 8 under 35 U.S.C. § 103(a).

E. Cocorullo in view of Henrichs

Claims 11 and 13 depend from claim 1, and thus require all of the elements recited in claim 1. As discussed above, Cocorullo fails to teach or suggest a combination including at least “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in claim 1, and required by claims 11 and 13.

The Examiner asserts that Henrichs “shows that a VCSEL and a diode are equivalent structures in the art and that they are both used in optical pumping.” Office Action, page 7. Such alleged teachings, even if combinable with Cocorullo fail to cure the above-noted deficiency of Cocorullo. That is, Henrichs also fails to teach or suggest “a buffer layer formed on a substrate,” wherein the “slab waveguide having a refractive index contrast of at least 0.2% is formed on the buffer layer ,” as recited in claim 1 and required by claims 11 and 13.

Because Cocorullo and Henrichs fail to teach or suggest every element required by claims 11 and 13, a *prima facie* case of obviousness has not been established. Accordingly,

Applicant respectfully requests that the Examiner withdraw the rejection of claims 11 and 13 under 35 U.S.C. § 103(a).

In view of the foregoing amendments and remarks, Applicant respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

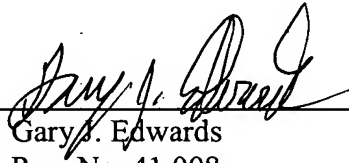
Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

Dated: July 24, 2006

By: \_\_\_\_\_

  
Gary J. Edwards  
Reg. No. 41.008

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